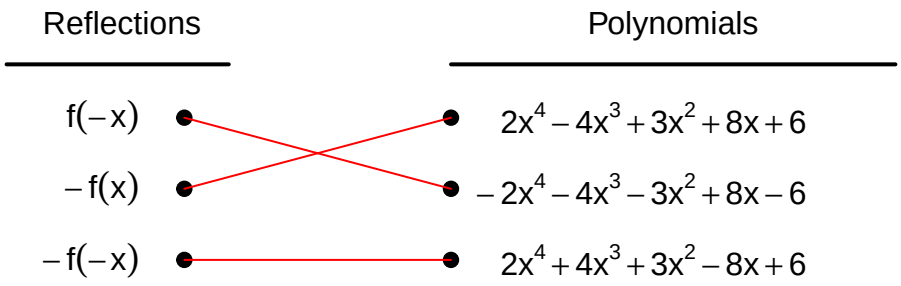
Name: Date:

Exam: Function Reflections (Solution version 31)

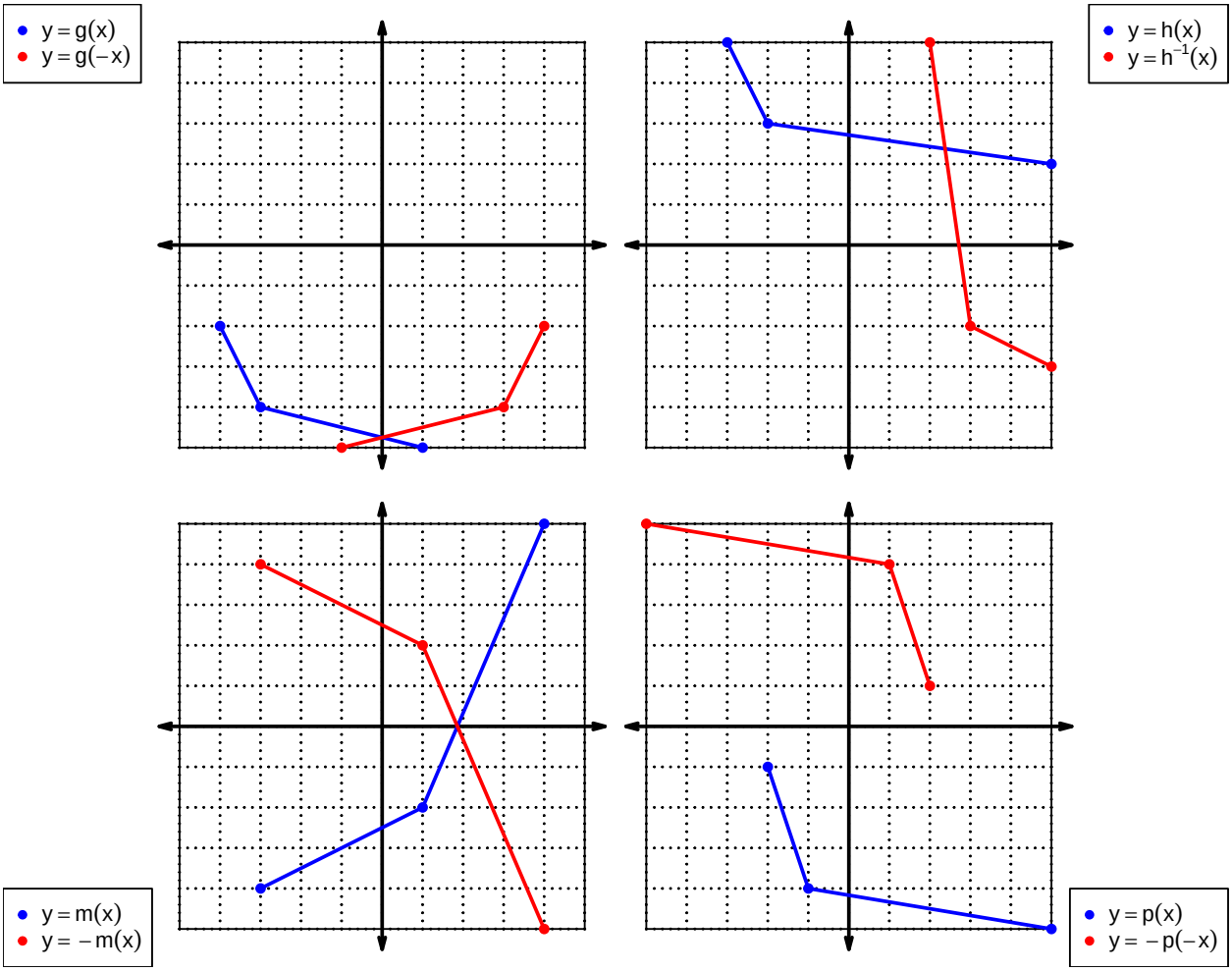
1. Let function f be defined by the polynomial below:

$$f(x) = -2x^4 + 4x^3 - 3x^2 - 8x - 6$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	5	6	4
2	7	1	3
3	4	3	1
4	3	9	2
5	2	7	9
6	9	2	5
7	6	5	8
8	8	4	6
9	1	8	7

3. Evaluate $g(4)$.

$$g(4) = 9$$

4. Evaluate $f^{-1}(2)$.

$$f^{-1}(2) = 5$$

5. Assuming f is an **odd** function, evaluate $f(-3)$.

If function f is odd, then

$$f(-3) = -4$$

6. Assuming h is an **even** function, evaluate $h(-8)$.

If function h is even, then

$$h(-8) = 6$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^2 + 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 + 1$$
$$p(-x) = -x^2 + 1$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 + 1\right)$$
$$-p(-x) = x^2 - 1$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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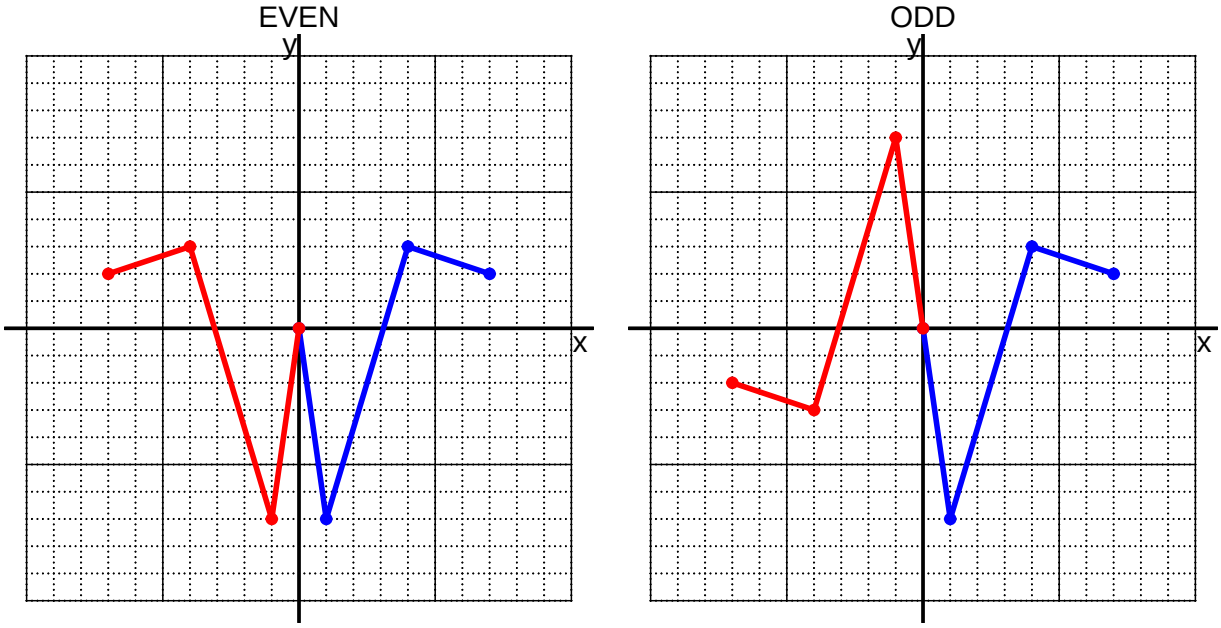
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 8x - 5$$

a. Evaluate $f(11)$.

step 1: multiply by 8
step 2: subtract 5

$$f(11) = 8(11) - 5$$
$$f(11) = 83$$

b. Evaluate $f^{-1}(11)$.

step 1: add 5
step 2: divide by 8

$$f^{-1}(x) = \frac{x+5}{8}$$
$$f^{-1}(11) = \frac{(11)+5}{8}$$
$$f^{-1}(11) = 2$$

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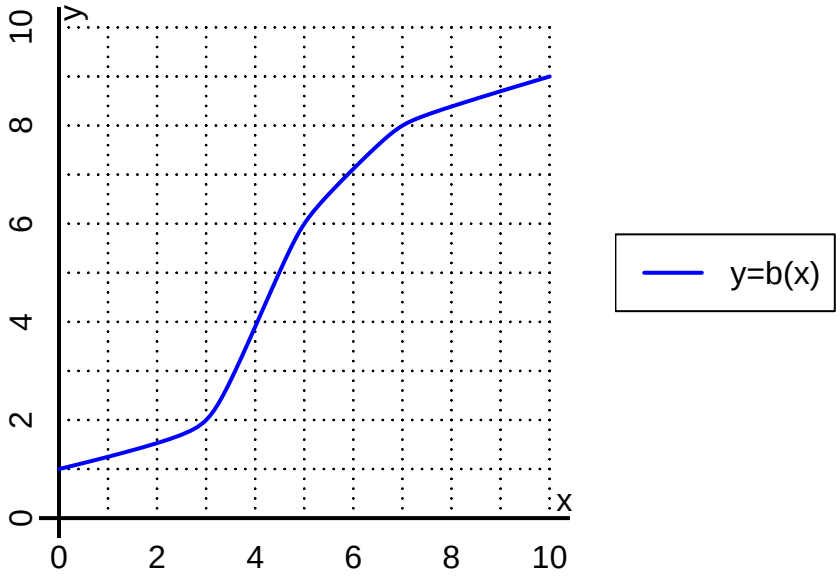
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(3)$.

$b(3) = 2$

b. Evaluate $b^{-1}(8)$.

$b^{-1}(8) = 7$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-3	3	3	-3
-1	7	-7	-7	7
0	0	0	0	0
1	-7	7	7	-7
2	3	-3	-3	3

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.